$E[F|J] = -1 > E[C|J] = -2$, so J never calls

King will always call in response to a bet.

?K • Bet • Call • +2

K? • Check • Bet • Call • +2

Queen will alway pass when passed $E[P_2|Q] = 0 > E[B_2|Q] = -1$

WTS Queen should always pass on first turn ✓

$$E[P_1|Q] = \frac{1}{2}P(P_2|J) + \frac{1}{2}(1 - P(P_2|J))(3P(C_1|Q) - 1) - \frac{1}{2}(P(C_1|Q) + 1)$$

$$= 1 + \frac{3}{2}P(C_1|Q) + \frac{1}{2} - \frac{3}{2}P(P_2|J)P(C_1|Q) + \frac{1}{2}P(P_2|J) - \frac{1}{2}P(C_1|Q) - \frac{1}{2}$$

$$= -1 + P(C_1|Q) + P(P_2|J) - \frac{3}{2}P(P_2|J)P(C_1|Q)$$

$$E[B_1|Q] = -\frac{1}{2} \quad \text{if } P(C_1|Q) > \frac{1 - 2P(P_2|J)}{2 - 3P(P_2|J)} \Rightarrow P(C_1|Q) > -\infty$$

King will alway bet in response to a pass. $E[B_2|K] > E[P_2|K] = 1$

$E[P_1|J] = -1$ because Queen will pass and king will raise $\Rightarrow$ Jack will fold.

$$E[B_1|J] = -2 \cdot \frac{1}{2} + -2 \cdot \frac{1}{2}P(C_2|Q) + 1 \cdot \frac{1}{2}(1 - P(C_2|Q))$$

$$-\frac{1}{2} - \frac{3}{2}P(C_2|Q) \Rightarrow P(C_2|Q) = \frac{1}{3}$$

$$E[P_1|K] = \frac{3}{2} - \frac{1}{2}P(P_2|J) \Rightarrow P(P_2|J) = \frac{2}{3}$$

$$E[B_1|K] = \frac{1}{2} + \frac{1}{2} \cdot 2 \cdot P(C_2|Q) + \frac{1}{2}(1 - P(C_2|Q)) = \frac{7}{6}$$

Next find $P(B_1|J)$ and $P(B_1|K)$

$E[\text{PI Raises} \mid \text{PII folds}] = 1$

$E[\text{PI Raises} \mid \text{PII calls}] = -2P(B_1|J) + 2P(B_1|K) = -2\alpha + 2\beta$

$$\frac{-2\alpha}{\alpha+\beta} + \frac{2\beta}{\alpha+\beta} = 1 \Rightarrow \beta = 3\alpha$$

What we have so far

Jack alway folds in response to call $P(B_2|J)=\frac{1}{3}$ $P(B_1|J)=\alpha$

$E[J]=-1$

Queen always passes and passes when PI passes $P(C_1|Q)=1/3$

$P(C_2|Q)=1/3$

King always bets in response to pass, will always call in response to bet $P(B_1|K)=3\alpha$

$E[Q]=-\frac{1}{3}$ $E[K]=\frac{7}{6}$